

## ABSTRACT OF THE DISCLOSURE

**[0050]** Systems and methods are provided for designing and producing custom-made templates for implantation or for pre-contouring metallic or polymer implantable plates prior to surgery. According to one embodiment, medical image data representing surrounding portions of a patient's anatomy to be repaired by surgical implantation of a bone reconstruction plate is received. Next, three-dimensional surface reconstruction is preformed based on the medical image data. Virtual removal of a bone or portion thereof to be reconstructed is performed with reference to the medical image data by simulating the contemplated surgical implantation procedure. Then, a representation of a template is created that is countered to fit the patient's anatomy to be repaired. Finally, a replica of the template is produced by using Solid Freeform Fabrication manufacturing techniques.

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